Kentucky Method 64-606-03
Revised 2/18/03
Supersedes KM 64-606-01
Dated 2/16/01

PERCENTAGE OF MATERIAL FINER THAN A NO. 200 SIEVE BY USE OF A PYCNOMETER (WASH TEST)

1. SCOPE: This method is intended to provide a rapid test, which will yield results comparable to AASHTO T 11 for determining the amount of minus No. 200 sieve material in aggregates. Tests in accordance with AASHTO T 11 are acceptable alternates to this method.

2. APPARATUS:

   2.1. Sieves: A nest of two sieves, a No. 200 conforming to AASHTO M 92 and a protective sieve approximately No. 16.

   2.2. Balance: A balance capable of weighing at least 7000 grams, sensitive and accurate to 1 gram.

   2.3. Pycnometer: A plastic or glass jug with a capacity of approximately 1 gallon fitted with a pycnometer top.

   2.4. Wetting Agent: Calgon powder is preferred.

   2.5. Funnel

   2.6. Towels

   2.7. Syringe

   2.8. Sample Splitter

   2.9. Container suitable for soaking aggregates.

3. SAMPLE:

   3.1. Field samples shall be obtained in accordance with AASHTO T 2.

   3.2. The minimum field sample mass and the mass of the test portion are listed in the following table. The sample shall be reduced in size by splitting or quartering, as applicable, in accordance with AASHTO T 248.

NOMINAL MAXIMUM SIZE	MINIMUM MASS OF FIELD SAMPLE	MINIMUM MASS OF TEST PORTION
No. 4 or less	10 lbs.	1000 grams
3/8 inch	10 lbs.	1500 grams
1/2 inch	20 lbs.	2500 grams
3/4 inch	30 lbs.	2500 grams
1 inch	50 lbs.	2500 grams
1 ½ inch	70 lbs.	3500 grams
2 inches	90 lbs.	5000 grams
2 ½ inches	125 lbs.	7000 grams

NOTE: If wet sieve analysis is desired, refer to KM 64-620 for test portion mass & test method.

3.3. When the size of the test portion exceeds the capacity of the pycnometer (greater than approximately 3500 grams for most aggregates) the test portion shall be divided into as many equal parts by mass as necessary to insure against overfilling of the pycnometer. All of the divided parts shall be tested.

4. PROCEDURE:

4.1. The test portion, if not in saturated-surface dry condition or wetter at the time it is prepared for testing, shall be brought to a saturated condition by soaking in water for at least 30 minutes.

4.2. Introduce the test portion and soaking water, if used, into the pycnometer jar. Be very careful not to lose any fines. Fill the jar with water to about 80 to 90 percent of capacity.

4.3. Place the pycnometer top on the jar and roll the pycnometer to eliminate air bubbles. Take care to avoid any loss of material.

4.4. Complete filling the pycnometer with water, wipe all excess water from the outside of the pycnometer, place on a balance, top off the pycnometer to a bead, and determine the total mass of the pycnometer, sample, and water to the nearest gram. Record this mass as W_1.

NOTE: Do not add wetting agent before this step is completed. Some aggregates may cause a foaming action during this step, which makes it difficult to form a water bead because of the entrapped air. An effective method to eliminate the entrapped air is to squeeze the jar to force foam out of the pycnometer top and soak up this overflow with a paper towel. Continue until all foam is removed from the pycnometer top.

4.5. Remove the pycnometer top and pour the free water over a No. 16 and a No. 200 sieve (nested in that order). Be careful not to let any water run out of the pycnometer without passing through the No. 16 and No. 200 sieves. Keep to a minimum the amount of larger particles that are decanted along with the water/fines mixture onto the sieves.

4.6. Refill the pycnometer to 80 to 90 percent capacity, add a small amount of wetting agent (Calgon) and replace the top. Be careful not to lose any sample or water, then thoroughly agitate the sample to separate the fines from the rest of the sample and to bring the minus No. 200 material into suspension.

4.7. Repeat steps 4.5 and 4.6 until the water become clear. It is necessary to use the wetting agent in the repeat steps only if the sample is very dusty and/or the fines are adhering to coarse particles.

4.8. After the wash water becomes clear, use a syringe to wash any material retained on the No. 16 and No. 200 sieves back into the pycnometer. Take care not to lose any of this material. Fill the pycnometer to 80 to 90 percent of capacity with plain water. No wetting agent is added during this step. Replace the pycnometer top, roll to eliminate air bubbles, then completely fill the pycnometer with water, wipe off all excess water from the outside of the pycnometer, place on a balance, top off the pycnometer to a bead, and weigh to the nearest gram. Record this mass as W_2.

4.9. Empty the sample from the pycnometer and completely fill it with plain water. Wipe off all excess water; place on a balance, top off the pycnometer to a bead, and weigh to the nearest gram. Record this mass as W_{bw}.

NOTE: The temperature of the water and aggregate in the pycnometer at the time W_1 and W_2 are determined shall be essentially the same as the temperature of the water at the time W_{bw}. is determined. Therefore, it will become necessary to redetermine values for W_{bw}. when appreciable temperature difference is noted or suspected.

5. CALCULATIONS:

5.1. The percentage of minus No. 200 material is calculated using the following formula:

$$Percent\ Minus\ No.\ 200 = \frac{W_1 - W_2}{W_1 - W_{bw}}\ x\ 100$$

Where:

W_1 = Mass of pycnometer, water and the test portion before washing.
W_2 = Mass of pycnometer, water and the test portion after washing.
W_{bw} = Mass of pycnometer and water.

5.2. Determine the percent of minus No. 200 material to the nearest 0.1 %. If more than one portion is tested, combine the masses from the separate tests and calculate as one test.

6. PRECAUTIONS: The temperature of the water must remain essentially constant throughout the test.

7. REPORT:

7.1. Report the percentage of minus No. 200 material (by wash) to the nearest 0.1 percent.

7.2. When test results are obtained that do not fall within specification limits, the failure must be verified. The unused field sample is to be tested in the same manner as the original test sample. When the original and the verification test results are reasonably close they are to be averaged to obtain a single reportable test result. When the two test results vary considerably further investigation will be necessary. Investigation may include checking test equipment, reducing field sample to test sample practices, methods of calculations and/or obtaining an additional field sample to test.

APPROVED _____
Director
Division of Materials

DATE_____2/18/03_____

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